"OUTCOMES OF OPEN AORTIC SURGERY IN PATIENTS WITH CHRONIC AORTO ILIAC OCCLUSION – A CLINICAL STUDY"

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M.Ch (VASCULAR SURGERY) –BRANCH - VIII

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DECLARATION

I solemnly declare that this dissertation entitled, **"Outcomes of Open Aortic surgery in patients with chronic Aorto iliac occlusion – A Clinical Study "** is a bonafide work done by me in Department of Vascular Surgery, Madras Medical College and Government General Hospital , under the guidance and supervision of the Professor **M.Rajkumar, M.S,DNB,M.Ch(Vascular Surgery).** Professor and Head of Department, Department of Vascular Surgery, Rajiv Gandhi Government General Hospital,Chennai.This dissertation is submitted to The Tamil Nadu Dr. M.G.R Medical University, in partial fulfillment of requirement for the award of Degree of **M.Ch Vascular Surgery.**

Place: **DR.M.BALAJI**

Date :

CERTIFICATE

This is to certify that the dissertation title **"Outcomes of Open Aortic surgery in patients with chronic Aorto iliac occlusion- A Clinical Study"** submitted by DR.M.Balaji appearing for M.Ch(Vascular Surgery) degree examination in August 2014 is a bonafide work done by him under my guidance and supervision in fulfillment of requirement of the Tamil Nadu Dr. M.G.R. Medical University. I forward this to The Tamil Nadu Dr. M.G.R. Medical University, Chennai.

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INTRODUCTION

Chronic Aorto iliac occlusion is found in patients with history of diabetes, hypertension, hyperchlosteremia and chronic tobacco use. This condition was first described by Leriche in 1923.

Patients with chronic aorto iliac occlusion commonly present with gluteal claudication ,erectile dysfunction and gangrene/tissue loss associated with rest pain of lower limbs

There are multiple investigation like segmental ABI, Duplex, CT/MR Angiography, Digital substraction angiography to asses the extent of lesion and physiological severity of these lesion. These investigations also help in deciding the optimal treatment in these cases

These lesions are amenable for surgical treatment with low morbidity and mortality in the current era due to advancement in surgical techniques, modern graft, anaesthesia techniques and modern ICU CARE.

For these lesions variety of treatment options are available like direct anatomical reconstruction or extra anatomical reconstruction or endovascular treatment. These options enable the

operating surgeon to select the most appropriate treatment for the patient considering the co morbidities and the anatomic lesion.

Since most of the patients present with diffuse aorto iliac occlusive disease, surgical bypass with graft remains the most effective means of revascularisation and continues to be superior in reliving rest pain, healing of ulcer, and improvement in ABI with low morbidity and mortality.

AIM

To study the post operative outcomes and complications of open aortic surgery in patient with chronic aorto-iliac occlusion.

MATERIALS AND METHODS

STUDY PERIOD:

Study duration is for 2 years from August 2011 to August 2013.

INCLUSION CRITERIA

All patients who underwent open aortic surgery for chronic aorto-iliac occlusion in the period of August 2011 to August 2013 were included for the study.

EXCLUSION CRITERIA

Patients presenting with acute limb ischemia (saddle embolism) are excluded from the study.

Patient presenting with aortic dissection presenting with lower limb ischemia are excluded from the study.

Patients with abdominal aortic aneurysm with aortic occlusion are excluded from the study.

Patient with aorto iliac occlusion presenting with incapacitating claudication, rest pain and tissue loss were offered surgical treatment.

Once these patients were admitted they underwent routine investigations like complete blood count, random blood sugar, liver function test, renal function test, chest X-ray and ECG.

All these patients underwent echocardiogram and a cardiologist opinion was obtained.

All these patient underwent pulmonary function test pre-op and were given inhalational spirometry for optimisation of pulmonary function.

Patients with old history of TIA/CVA were evaluated with carotid duplex .

Patients were put on antipaletlet (ASPIRIN 75 MG OD),ANTI lipidemic drug(Atorvastatin 40 mg od),Anti hypertensive(atenolol 50mg od),patient presenting with tissue loss/gangrene were put on inj.Heparin 5000 i.u intravenously every 6^{th} hourly.

All diabetic patients who were on oral anti-diabetic drugs were switched over to injection insulin to prevent lactic acidosis.

All these patient had a 64 slice CT Angiogram of aorto with bilateral lower limb vessel after hydrating these patient with normal

saline and Tab N-Acetyl –Cystine 600mg BD were given in patients who had elevated renal parameters before taking CT Angiogram and given post angiogram for 2 days.

These patients were offered surgical treatment after explaining the risk and complication of surgery. Patient who were willing for surgery were planned for aorto bi femoral/iliac bypass depending on the indication and the anatomical lesion.

All patients were followed post op with ABI, Clinical examination, Duplex once a month.

REVIEW OF LITERATURE

HISTORY

- John hunter in late1700 first noted the occlusion of aortic bifurcation and its clinical implication of the occlusion.
- In 1923 Rene Leriche described a condition of obliteration of distal aorta and stated that the ideal treatment would be resection of the area and re-establishment by graft.
- In 1950 Oudot resected the terminal aorta and replaced it with 24-day-old homologous autograft.
- In 1955 Cockett performed the first aortic bypass graft without removing the aorta .
- IN 1951 Wylie did the first aortic endarterectomy.
- In 1954, DeBakey - built a new knitting machine to make seamless Dacron grafts from whence aortic reconstruction with graft became feasible in all centres.

PATHOLOGY

Aorto iliac disease begins usually at the aortic terminus or at the common iliac artery origin and then progresses proximally and distally.

CLINICAL PRESENTATION

Usually these patients present as claudicants due to adequate collateralisation. The primary collateral networks develop from the lumbar and hypogastric feeding vessels and they connect with circumflex iliac artery, hypogastric artery, femoral artery, and profunda artery. Additional collaterals that occur in extreme obstruction are the internal mammary to inferior epigastric artery and the superior mesenteric artery to inferior mesenteric artery and haemorrhoidal arteries.

One third of patients operated on for symptomatic Aorto iliac occlusive disease have significant profunda femoris orificial occlusive disease, and more than 40% have superficial femoral artery disease.

DIAGNOSIS

Patient usually presents with bilateral gluteal/lower limb claudication, rest pain or tissue loss in the form of gangrene or non healing ulcer. Usually these patient have co morbidities like diabetes, hypertension, coronary artery disease, carotid disease and poor lung function due to smoking.

On examination wasting of bilateral gluteal/thigh wasting with absent femoral /aortic pulsation is noticed.

Investigation – segmental pressure, ABI, duplex, CT – Angiography, MR –Angiography helps to identify the lesion and plan the appropriate procedure for the patent.

TREATMENT

Patient presenting with claudication are usually given best medical management with exercise therapy.

Patient with incapacitating claudication, rest pain and tissues loss are taken up for endovascular /open surgery.

Endovascular procedures are provided to patient with TASC A and TASC B Lesion.

TASC A LESION-

- Unilateral or bilateral stenosis of common iliac artery.
- Short stenosis (less than 3 cm) involving uni lateral ,bilateral external iliac artery.

TASC B LESION-

- Short stenosis of infra renal aorta (less than 3 cm)
- Unilateral Common iliac artery occlusion.
- Single or multiple stenosis totallying 3 to 10 cm involving External iliac artery not extending into common femoral artery.

- Uni lateral External iliac artery occlusion not involving orgin of internal iliac or CFA

TASC C:

- Bilateral common iliac artery occlusion
- Bilateral EIA Stenosis 3-10 cm not extending to CFA
- Uni lateral EIA Stenosis extending into CFA.
- Heavily calcified unilateral EIA not involving internal iliac artery orgin or CFA orgin.

TASC D

- Infra renal aortic occlusion
- Diffuse disease involving aorta and bilateral iliac arteries
- Diffuse multiple stenosis of CIA,EIA and CFA.
- Bilateral Occlusion of EIA.

Patient with TASC C & TASC D lesion, highly calcified aortic bifurcation, failed endovascular procedure, patients with an aortic or iliac source of distal emboli, typically from an ulcerated athermatous plaque or so-called shaggy aorta are candidates for open aortic reconstruction.

Patients treated for claudication or rest pain usually require only a single-stage inflow operation, simultaneous or staged inflow and outflow revascularization should be considered in patients with tissue loss.

PRE-OP Preparation: Patient has to undergo complete blood investigation, renal function test, liver function test and pulmonary function test. All these patient must undergo echocardiogram and a cardiac work up. All patients must be started on anti platelets, anti lipedemic drugs, beta blockers and heparin if they present with tissue loss. Patient diabetes, hypertension and pulmonary function must be optimized before taking up for surgery.

All patient after taking a proper informed consent explaining the benefit and risk of the procedure patient are taken up for surgery.

AORTOILIAC ENDARTERECTOMY

The benefit of endarterectomy is the elimination of the need for a prosthetic graft, making it an alternative in the setting of infection and removing the late graft-related complications.

Endarterectomy is most suited for younger patients or those with small vessels who are less than ideal candidates for endovascular therapy or aortobifemoral grafting.

Patients with erectile dysfunction attributable to proximal segment hypogastric occlusive disease are also well suited to this therapeutic option.

These patients have a greater degree of improved pelvic perfusion following Aorto iliac and hypogastric endartrectomy compared with those undergoing ABFB grafting, and high rates of restored sexual function.

Endarterectomy is a durable option for focal stenotic lesions in large-caliber, high-flow vessels. Indeed, the technique is efficacious in patients with localized disease limited to the distal aorta or proximal iliac arteries, and they have excellent long-term patency.

In cases of long-segment disease involving the entire infrarenal aorta and extending into the external iliac arteries results have been disappointing.

In current practice, endarterectomy is now rarely performed, owing to its relative technical difficulty, potential for significant

blood loss, and poor durability, as well as the clear advantages of bypass grafting in this location

The increasing endovascular therapy is further eroding the already small proportion of patients considered suitable for this reconstructive approach.

TECHNIQUE

A cleavage plane is developed between the plaque and the outer layers of the wall, with the exact location dependent on the size, location, and muscular content of the involved artery.

Haimovici has catagorised three cleavage planes as subintimal, transmedial, and subadventitial; in his view, the latter two planes are preferred ,as the subintimal plane predisposes to thrombosis.

The residual outer layer has sufficient mechanical strength to hold sutures and resist disruption or enlargement when subjected to arterial pressure. In some circumstances, the residual adventitia may be thinned to such a degree that reconstruction of the wall with a patch or, in some cases, an interposition graft is necessary, this often occurs when the plaque is extensively calcified.

The simplest approach from a technical point is the so-called open method, which employs a longitudinal arteriotomy that allows direct visualization of both endpoints as well as the entire endarterectomized surface; this technique is most commonly used for disease limited to the aorta and common iliac arteries. If primary closure is rendered problematic by the small or marginal caliber of the vessel, patch angioplasty using a vein, synthetic material, or bovine pericardial patch material should be undertaken.

Extraction, eversion, and semiclosed methods are the other variants. The semi closed technique, useful to treat the external iliac arteries, involves arteriotomies at both the proximal and distal extents of the plaque and the initiation of plaque excision at the endpoints, similar to that undertaken in the open technique.

A ringed stripper is then advanced between the endpoints to complete the plaque disengagement, obviating the need for full exposure of the treated segment.

In 1970s, Inahara modified the technique of eversion endarterectomy first described by Harrison and colleagues, whereby the circumferentially dissected iliofemoral arterial segment is transected distally and passed proximally under the inguinal ligament into the pelvis before being endarterectomized and later reattached

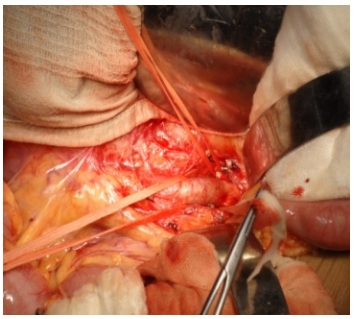
CT ANGIO- showing Bilateral CIA Origin Occlusion

CT ANGIO- showing Infra renal aortic Occlusion with bilateral Iliac occlusion

CT ANGIO- Showing Infra renal aortic Stenosis with Left Iliac Stenosis

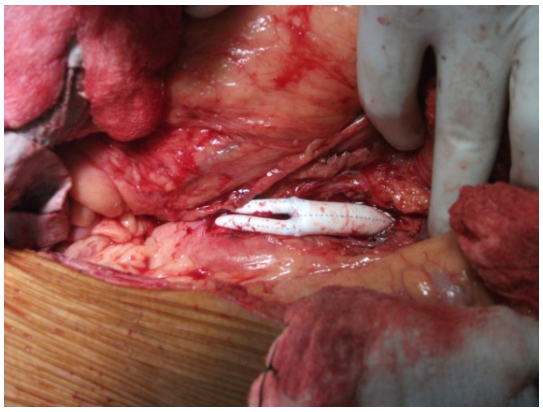
CT ANGIO- Showing JUXTA Renal Aortic occlusion

Bilateral femoral artery exposed



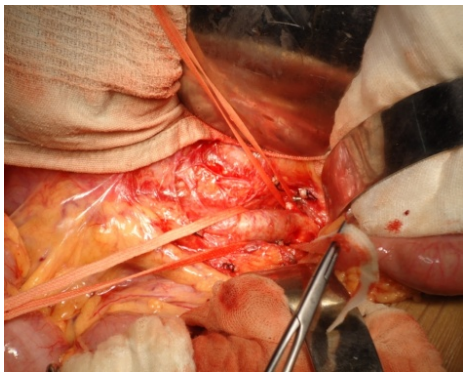
Aorta exposed by midline laparotomy

SURGERY FOR INFRA RENAL AORTIC OCCLUSION

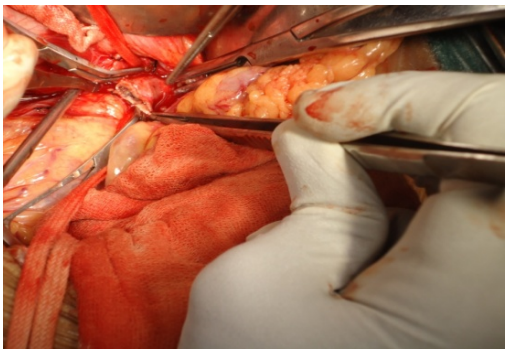


Aortic End to Side Anastomosis

Femoral End to Side Anastomosis

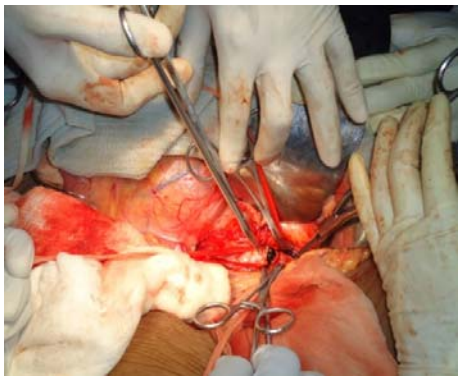


Aorta & Renal artery Dissected and controls taken.

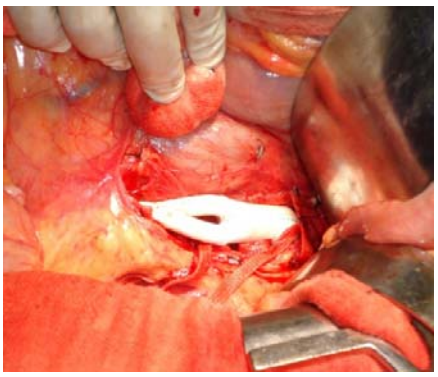


Aorta transected

SURGERY FOR JUXTA RENAL AORTIC OCCLUSION



Aortic Thrombo Endarterectomy performed



End to End Anastomosis performed

AORTOBIFEMORAL BYPASS

The femoral vessels are exposed through bilateral longitudinal incision, the distal extent of the dissection ends with control of the proximal SFA & the profunda femoris arteries; the inferior epigastric artery & circumflex iliac artery branches mark the proximal extent of the dissection.

The graft limbs will course through the retro peritoneal tunnel to reach the femoral region which is created with blunt dissection posterior to the inguinal ligament, the ligament can be partially divided posteriorly for preventing graft limb compression.

The tunnels should be anterior to the external iliac vessel, and posterior to ureters. A crossing vein present below the inguinal ligament must be ligated or avoided to prevent bleeding during the tunneling.

Infrarenal aortic exposure is often performed through a transperitoneal approach via a longitudinal midline laparotomy, although some prefer a transverse incision. The midline incision typically extends from below the xyphoid process to just inferior to umblicus.

The transverse colon is retracted cephalad, and the small bowel is retracted to the patient right side. The ligament of Treitz is cut, and the duodenum is mobilized to the right, to allow access to the infrarenal aorta. A self-retaining fixed retractor is used to aid in exposure.

The retroperitoneal tissue lying over the aorta is dissected superiorly up to the level of the left renal vein, and larger lymphatic vessels in the retroperitoneal lymphatic network are to be ligated.

Dissection just anterior to the aortic bifurcation and proximal left iliac artery is avoided because the autonomic nerve plexus sweeps over the aorta in this region.

If exposure in these area is necessary, dissection along the right lateral aspect of the infrarenal aorta and reflecting the tissues overlying the terminal aorta and proximal iliac arteries can reduce the risk of neurogenic sexual dysfunction.

If thrombus or aortic calcification extend to the level of the renals, it is necessary to do aortic dissection to the suprarenal level to allow for safe proximal clamp placement.

Alternatively, proximal control can be got by intra-luminal balloon deployment or by supraceliac clamping. It is necessary to

extend the reconstruction to the level of the renals to minimize failure secondary to disease progression in the remnant infrarenal aortic neck.

If end-to-side repair is to done, exposing and controlling all relevant lumbar or accessory renal arteries before performing the aortotomy is needed to avoid back bleeding.

The superior aspects of the graft limb tunnels are completed with digital blunt dissection from above and as well as below, maintaining a course anterior to the iliac vessels but posterior to the ureters.

On the left side, the tunnel has to pass beneath the sigmoid mesentery and more laterally to prevent disruption of the autonomic nerve plexus

With vessel exposure and tunnelling completed, before vascular clamping, 5000 units of heparin is given as an intravenous bolus.

CLAMP PLACEMENT

The aorta should be palpated to identify the optimal sites for application of the cross-clamps.

Anterior to posterior clamping is needed in the presence of a soft anterior & calcified posterior aortic wall. The aorta is clamped by atraumatic vascular clamp proximally or distally at the site of least disease to avoid dislodgement and distal embolization of plaque. The distal clamp is placed above or below the inferior mesenteric artery.

The proximal clamp is to be placed just below the renals, if the disease pattern do not allow suprarenal clamping, little dissection of the renal artery origins are done.

If an end-to-end repair is planned, the aorta is to be transacted several inches below the proximal clamp, and the distal aorta is over sewn in two layers with monofilament suture or stapled with a stapler.

A segment of the distal aortic cuff is to be excised to allow better exposure of the aortic neck and precise proximal reconstruction. This allows the graft to lie flat against the vertebral column and this facilitates easy retroperitoneal coverage. If it is necessary, it is very important to carry out a complete thrombo-endarterectomy of the infrarenal aortic neck . through removal of thrombotic debris and calcified plaque facilitates better

suture placement and making of a widely patent proximal anastomosis.

Repositioning of the proximal clamp to suprarenal position or digital pressure application sufficient to temporarily occlude the suprarenal aorta is needed to ensure the thorough removal of all intraluminal debris. Mobilization and retraction of the left renal vein cranially or caudally will facilitate adequate exposure of the juxtarenal aorta.

Division of the left renal vein is unnecessary usually but it is acceptable if additional exposure is needed, it is important to preserve adrenal, lumbar, and gonadal collateral branches. If suprarenal clamping is done, concurrent clamping of the renal arteries is needed to prevent the inadvertent embolization into the Renals.

Some patients have aortic occlusion extending to the level of the renals. These sub group of patients are best managed by controlling the renal arteries and then doing thrombectomy of the infrarenal cuff, without the placing an infra-renal proximal aortic clamp, which could cause displacement of thrombotic materials proximally.

The aortic plug seen at this location is soft, propagated, secondary thrombus that can be removed very easily with a help of Kelly clamp. The aortic pressure is used to flush out the plug, suprarenal control is briefly utilized. Remnant debris is to be cleared from the infrarenal cuff, the aorta is to be flushed again, the renal arteries should be backbled, and an infrarenal clamp is placed.

GRAFT SELECTION

A bifurcated graft sized to match the size of aorta and femoral vessels is selected. Polytetrafluoroethylene (PTFE) grafts & knitted polyester (Dacron) grafts are commonly used

Bifurcated grafts measuring 18 x 9 mm or 16 x8 mm are used for male patients; grafts measuring 14 x7 mm or 12 x 6 mm are usually suitable for female patients.

ANASTOMOSES

END TO END ANASTOMOSES

Those who favour an end-to-end configuration claim that this facilitates a better comprehensive thrombo-endarterectomy of the proximal stump and there is a better in-line flow pattern, with less turbulence and a better hemodynamic.

Low rate of proximal pseudo aneurysm and improved long-term patency rates reported in some of the series support to this view. Stapling or over sewing of the distal aorta with the end-to-end technique reduces the risk of clamp-induced embolization to the lower extremities following de clamping of the distal aortic clamp.

Further, in this approach the graft lies much flatter in the retro peritoneum, this allows better closure of the retro peritoneum over the graft, resulting in much lower rate of late graft infection & aortoenteric fistulae, however there is little direct evidence to support this claim.

Finally, creating a end-to-side anastomosis could be highly challenging in a heavily diseased aorta, particularly if aorta is partially occluded by side-biting clamp . In settings of concomitant aneurysmal disease or complete aortic occlusion which is extending up to the level of the renal arteries, an end-to-end approach should be used.

END TO SIDE ANASTOMOSES

The common indication is in patients with occlusion or severely diseased external iliac arteries but patent common and

internal iliac arteries, in these patients the interruption of forward aortic flow may result in the loss of critical pelvic perfusion. Without the retrograde flow via the external iliac arteries which is normally present in an end-to-end anastomosis, pelvic ischemia, which ranges from mild hip claudication in some, severe buttock rest pain in some or ulceration in some patients, may occur.

Additional ischemic symptoms, like erectile dysfunction occuring in males and rarely paraplegia secondary to cauda equina syndrome, can be avoided with an end-to-side configuration.

Preserving a large inferior mesenteric artery, is necessary to avoid colonic or mesenteric ischemia, or important accessory renal artery taking off from the aorta or an iliac artery can more easily be accomplished with an end-to-side configuration. Alternatively, these vessels could be re-implanted onto the side of an end-to-end graft.

Technique

For an end-to-end proximal anastomoses, the body of the graft is shortened to decrease the graft redundancy and this allows the graft limbs to straddle rather than override the transacted aortic stump . The anastomois is performed with 3-0 polypropylene suture.

If an end-to-side anastomois is to be performed, a bevelled anastomois is fashioned after an approximately 3-cm longitudinal aortotomy which is to be created as close to the renal arteries as possible.

Care is to be taken to remove all loose debris and mural thrombus from the excluded portion of the aorta and an effort is made to ensure adequate back flushing of all clot and debris before re-establishing forward flow in the native aorta and graft.

Side-biting clamps are avoided when doing an end-to-side anastomosis because they could compress the aortic sidewalls, making thrombo-endarterectomy and accurate suture placement very difficult.

After completion of the proximal anastomosis, the graft limbs are to be clamped with clamps and to be flushed with heparinized saline. Then graft limbs are passed through the retroperitoneal tunnels, care is taken to prevent twisting and to eliminate excess redundancy, and attention is then turned to the distal anastamosis.

Proximal femoral control is obtained with either a soft clamp or Satinsky clamp placed from a lateral direction, and distal control is usually achieved with vessel loops or atraumatic bulldog or by profunda clamps.

For patients with normal femoral artery and distal runoffs, a longitudinal arteriotomy limited to the distal CFA is sufficient. More commonly, extension of the arteriotomy across the profunda femoris origin and profundaplasty would be necessary. The distal anastomoses are completed in a bevelled end-to-side fashion using 5-0 polypropylene, carrying out retrograde and antegrade flushing manoeuvres before completing the anastomoses and restoring the flow. It is important to inform the anaesthetic team before clamp release, to combat blood pressure drop with reperfusion.

CLOSURE

Before wound closure, the surgeon must doubly confirm adequate distal perfusion and no distal embolization has occurred.

The quality of the Doppler signals & pulses beyond the distal anastomosis and at the pedal level is assessed. The colour, temperature, and general appearance of the feet are to be checked.

Once hemostasis is achieved, the abdomen is irrigated well and the retro peritoneum is closed over the proximal anastomosis and graft behind the duodenum to the extent possible. If at all adequate retroperitoneal coverage is not possible, a sleeve of

omentum should be used to cover any exposed segment of the anastomosis and to separate the graft from the bowel.

The groin wounds are well irrigated with antibiotic solution, and the deeper tissue is closed in multiple layers using absorbable Vicryl sutures.

The other modality of treatment available are extra anatomical bypass viz axillo bi-femoral bypass and endovascular therapy.

Complications:

Overall morbidity rates range from 17% to 32% following aortic surgery for Aorto iliac occlusive disease. Cardiac complications are the commonest cause of mortality and results from the hemodynamic stress associated with major vascular surgery and the fluid shifts occurring during the early postoperative period.

Pulmonary complications are common and are most likely to occur in the elderly or those with chronic obstructive pulmonary disease, a significant smoking history, or poor preoperative nutritional status.

Adequate pain control, appropriate diuresis, and strict attention to pulmonary toilet are important measures to prevent the development of pneumonia and the progression of relatively benign alveolar collapse to more extreme degrees of pulmonary collapse.

Acute renal failure following aortic reconstruction for Aorto iliac occlusive disease is relatively uncommon in patients with normal pre-operative renal function, even after a period of suprarenal clamping.

Adequate hydration, avoiding repetitive aortic cross-clamping and peri-operative hypotension are valuable prophylactic manoeuvres in avoiding renal failure; less clear is the benefit of using mannitol and furosemide prior to aortic cross-clamping to induce diuresis.

Acute tubular necrosis or the effects of athero-emboli resulting in progression to dialysis dependence renal dysfunction can occur in those patients especially with a preoperative Creatinine greater than 1.8 mg/dL.

Injury to the ureter during dissection, graft tunneling, or retroperitoneal closure can be avoided with careful surgical technique and diligence.

Spinal cord ischemia is a devastating complication of infra-renal aortic surgery and is potentially preventable. The central component of prophylaxis is careful preservation of hypogastric perfusion.

The use of gentle techniques to minimize the risk of athero-embolism and avoiding peri- and postoperative hypotension have also proved to be important preventive measures. However these complication are uncommon, occurring in only 0.3% of AI reconstructions for occlusive disease in one series.

Hemorrhage

Bleeding complications following Aortic endarterectomy, usually occurs when the treated segments were extensive, this complication was partly responsible for the waning popularity of this technique.

With modern-day sutures , patch materials and less extensive disease typically repaired in this current era, bleeding associated with endarterectomy has become less problematic.

For patients undergoing aorto-bi-femoral grafting, postoperative hemorrhage is a relatively rare , occurring in about 1% to 2% of cases. This is due to greater awareness of bleeding

disorders, better intra-operative anticoagulation , blood products management, and the improved haemo-static properties of the grafts.

Bleeding points occurring in the anastomotic suture line following test release of aortic or femoral clamps are usually effectively managed with sutures re-enforced with felt pledgets.

It is always important to replace the clamp before placing any repair stitches, because any attempted placement under tension risks of extending the defect and worsening the bleeding.

In cases where the walls of the infra-renal aortic cuff are thin following thrombo-endarterectomy, a sleeve of graft advanced over the aortic suture line can act as a prophylactic bolster.

Intraoperative venous injuries occur during dissection between the aorta and Inferior vena cava or from tear in a lumbar vein; such injuries can often be controlled with tamponade. A variety of sealants, glues, and thrombin-based hemostatic adjuncts are available to help control diffuse oozing and persistent needle hole bleeding.

Bleeding may present in delayed fashion if the postoperative blood pressure is become higher than the pressure at the time of closure.

Blood products - platelets and fresh frozen plasma, are the preferred replacement fluids in most cases during the early postoperative period, if intraoperative blood loss was significant and the patient is at the risk for dilutional coagulopathy.

Postoperative monitoring of the abdominal girth, hematocrit, bladder pressure, coagulation parameters, and hemodynamic status is needed to identify ongoing bleeding.

Intestinal Ischemia

Intestinal ischemia following aorto-iliac reconstruction has been reported in 2% of cases. The involved segments are usually the rectosigmoid, and the cause is multi-factorial.

Sacrifice of either the primary or the main collateral source of perfusion to the colon during reconstruction is the most common causative event, peri-operative hypotension leading to insufficient perfusion and athero-emboli are other possible causes.

If compromised bowel perfusion is recognized intra-operatively following end-to-end anastomosis, inferior mesenteric artery re-implantation is indicated.

Some surgeons advocate routine re-implantation of all patent inferior mesenteric arteries as the safest means to avoid colonic mal-perfusion, this practice has not been universally adopted.

Intraoperative detection of intestinal ischemia can be very difficult. Direct visual assessment, interrogation of Doppler flow along the anti-mesenteric border, measurement of the inferior mesenteric artery stump pressure, and the use of intravenous fluorescein have been used.

Due to delayed presentation, maintaining a high index of suspicion and having a low threshold for performing sigmoidoscopy during the early postoperative period are critical to avoid catastrophic colonic perforation.

LATE COMPLICATIONS:

Graft Thrombosis

Graft thrombosis is the most commonly encountered late complication . It occurs in as many as 30% of cases in some series where the grafts were observed for 10 years or longer.

Occlusion of the entire graft is rare and usually stems of the graft is seen occluded, especially when the proximal anastomosis is inappropriately low in relation to the renal arteries, with subsequent progression of proximal atherosclerosis.

A more commonly seen occurence is unilateral limb thrombosis, which most often due to progressive intimal hyperplasia at the distal anastomosis or progression of outflow disease.

Flow can frequently be restored by using special thrombectomy catheters designed to remove the chronically adherent fibrinoid thrombus . If inflow is successfully restored, revising the distal anastomotic site with a profundaplasty or extension of the graft may prove necessary.

If extensive progression of outflow disease is encountered, or if the extraction of a distally propagating thrombus is not successful, addition of an outflow graft may be needed to ensure patency of the revascularized limb

A femorofemoral or axillofemoral graft usually suffices as a secondary source of inflow when an aortobifemoral limb is not successfully reopened.

FALSE ANEURYSM

Anastomotic false aneurysms are less common in modern practice compared with the early experience of aortic grafting, but they can be seen as a late complication in 1% to 5% of cases . They usually arise secondary to a weakening in the suture line due to structural fatigue or fabric degeneration.

Undue tension, poor suturing techniques, and weakening of the recipient arterial wall following endarterectomy have been implicated as causative factors. Infection plays a vital role in many cases, despite the absence of any obvious clinical signs.

Staphylococcus species are the organisms usually identified in cultures. Femoral anastomotic false aneurysms are the most common and typically present as a slowly enlarging, asymptomatic groin bulge.

Proximal anastomotic false aneurysms are usually discovered incidentally during radiographic evaluation for other reasons or come to attention when they rupture.

Repair is generally recommended for femoral false aneurysms larger than 2 cm or aortic false aneurysms greater than 50% of the graft diameter.

Treatment usually consists of debridement of the degenerated tissue and placement of a short interposition graft.

Graft Infection

Prosthetic graft infection is the most feared complication of aortic reconstruction, due to its high associated morbidity and mortality . The diagnosis is usually by a combination of clinical suspicion , CT or isotope-labeled leukocyte scanning, with the groin being the most common site of presentation.

On occasions, exploration is needed to confirm the diagnosis. Prevention through strict adherence of sterile technique, particularly in presence of septic distal ulcerations, and the timely administration of preoperative antibiotics is very critical.

Graft contamination at the time of implantation is very difficult to prove but is believed to be common cause. Once graft infection is diagnosed, graft excision is usually indicated.

AORTOENTERIC FISTULA

Aortoenteric fistula is rare but potentially devastating late complication associated with aortobifemoral grafting The most common patho-physiologic process is the erosion of the proximal aortic suture line through the third or fourth portion of the duodenum, although fistulae between the iliac anastomoses into the small bowel or colon are also described.

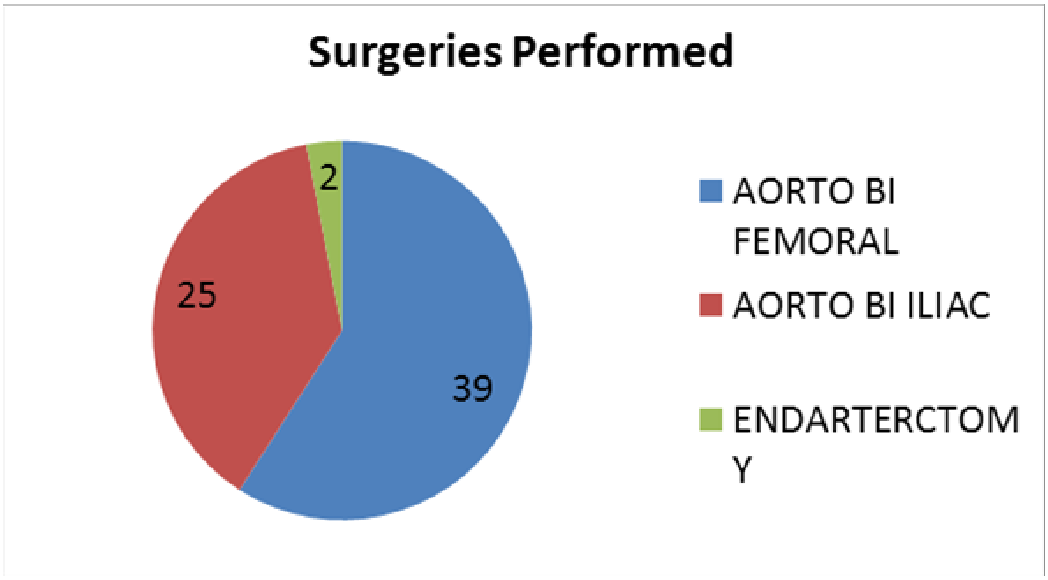
The diagnosis can be challenging and involves combination of CT scanning, endoscopy, and angiography. The classically described triad of G.I bleeding, sepsis, and abdominal pain is present in only a minority of patients.

Commonly , a small, self-limited “herald bleed” presages a large gastrointestinal bleed, which can be massive in nearly one third of cases.

Treatment is similar to that for graft infection; extra-anatomic bypass and graft removal are usually required, in addition to repair of the involved gastrointestinal tract.

Dedicated efforts to provide adequate tissue coverage between the graft and the overlying bowel before abdominal wall closure are important in preventing this complication.

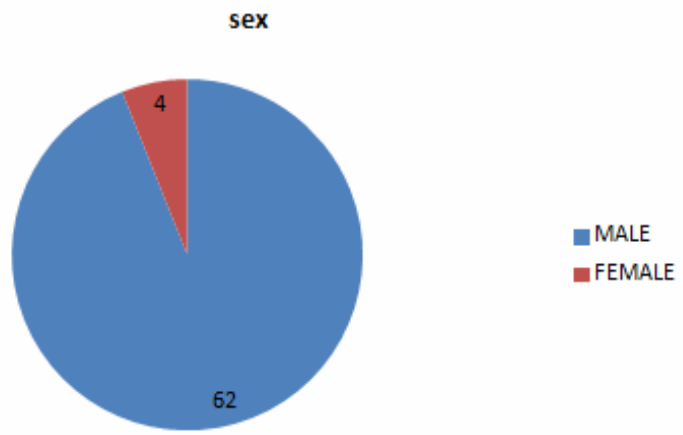
RESULTS

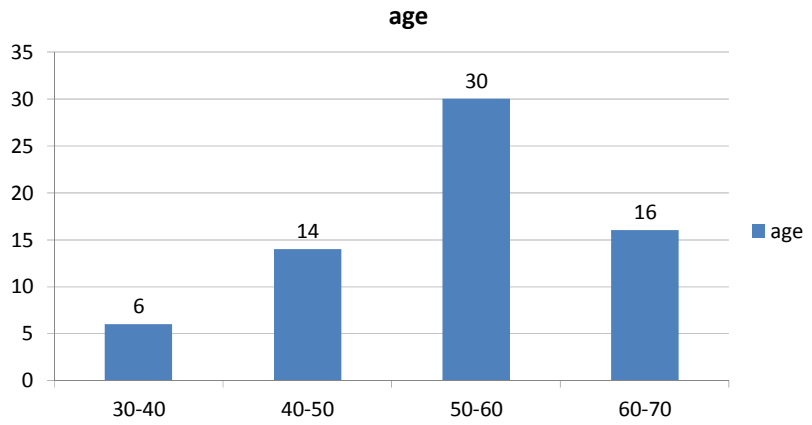


In our study population of 66 cases who under went open Aortic surgery in our study period, 39 patient underwent aorto bi femoral bypass, 25 cases underwent aorto bi iliac bypass and 2 of them aortic endarterectomy.

Sex

- There were 62(93%)males,
- 4(7%) females.





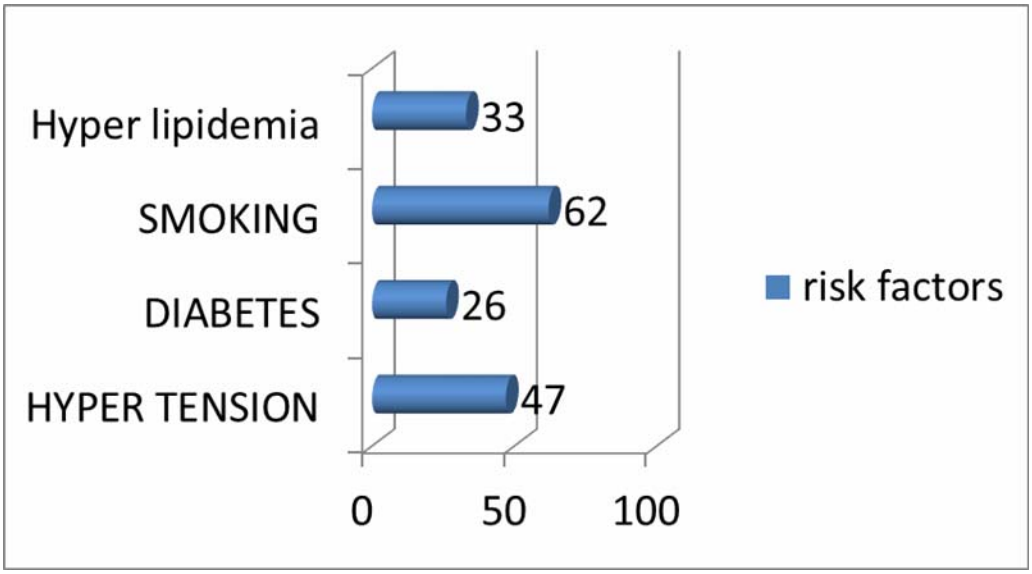
The patients were categrosied into 4 groups- 30-40 yrs group had 6 cases(9%),40 to 50 yrs group had 14 cases(21%), the 50 to 60 yrs group had 30 cases(45%) ,60-70 year group had 16 cases(24%).

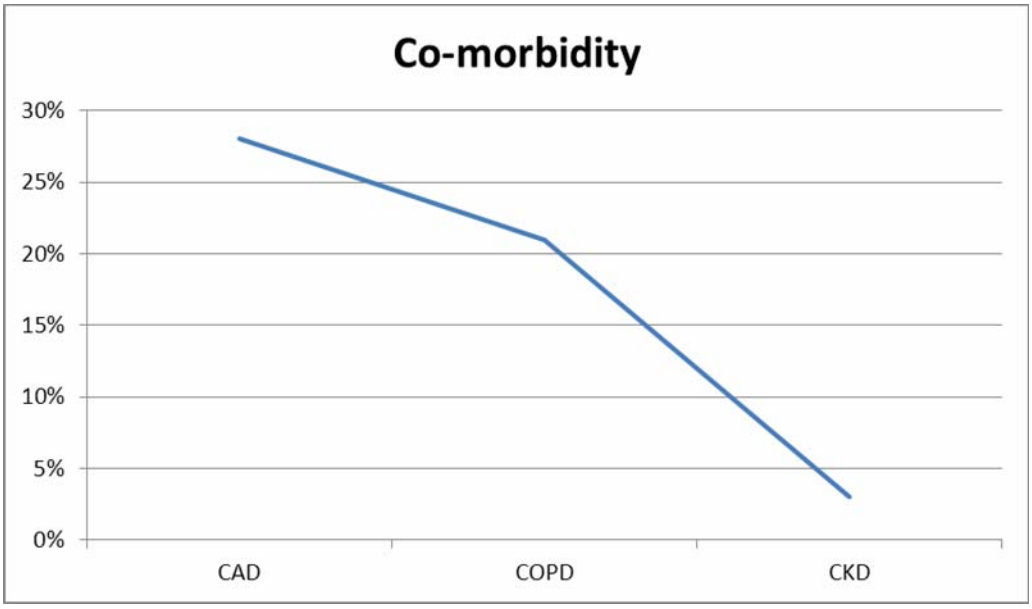
The third group(50-60) had the highest population.(45%)

The mean age was 51.9 years (range from 32 to 69 yrs)

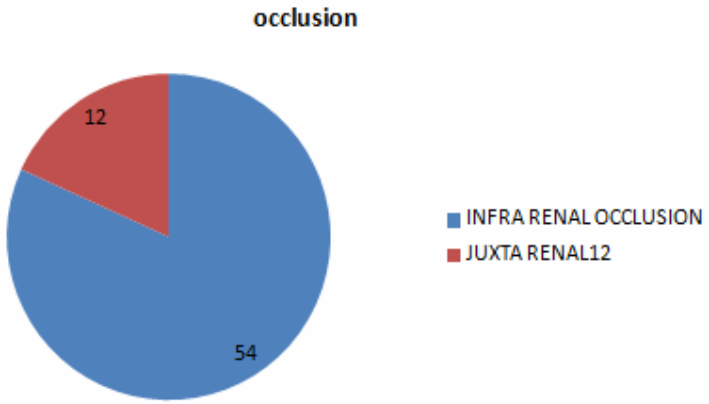
In our study nearly 93.3% had smoking as the risk factor,70% had hypertension has a risk factor,50% had hyper lipidemia as a risk factor and 40% had diabetes as a risk factor.

Nearly 44 patients (66%) had 2 risk factors and 20 patients had more than 2 risk factors (30%).



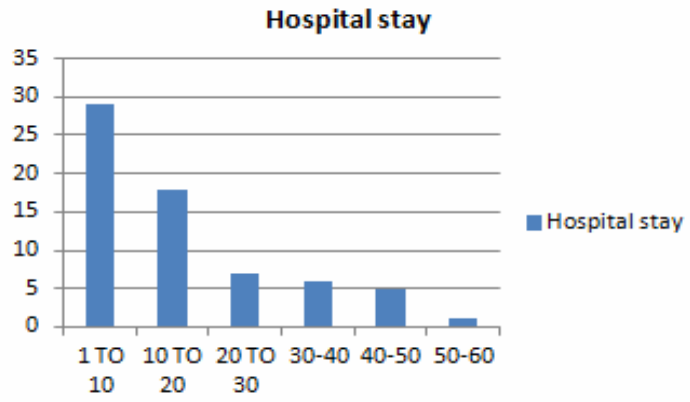


In our study population 28 (42.2%) patients had Coronary artery disease, 14 patients(21%) had COPD and 2(3%) patients had CKD as co-morbidity.



- 54(81%) infra renal aortic occlusion
- 12 (19%)juxta renal aortic occlusion

n



In our study the number of hospital stay of the patient post surgery was

1-10 days -29 (49%)

10-20 days- 18 (27%)

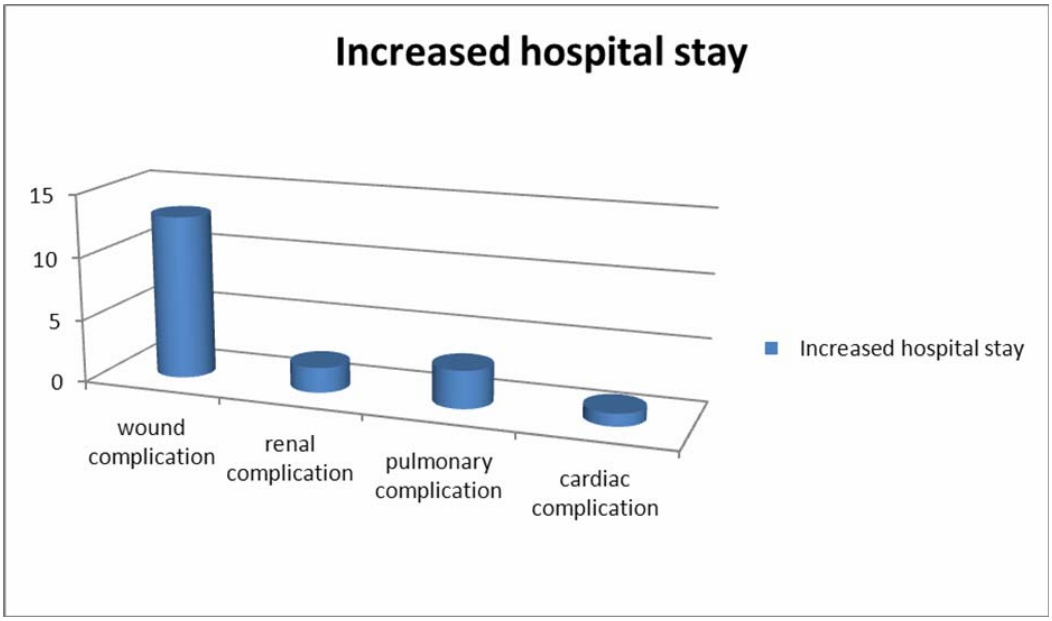
20-30 days - 7 (10%)

30-40 days - 6 (9%)

40-50 days - 5(7.5%)

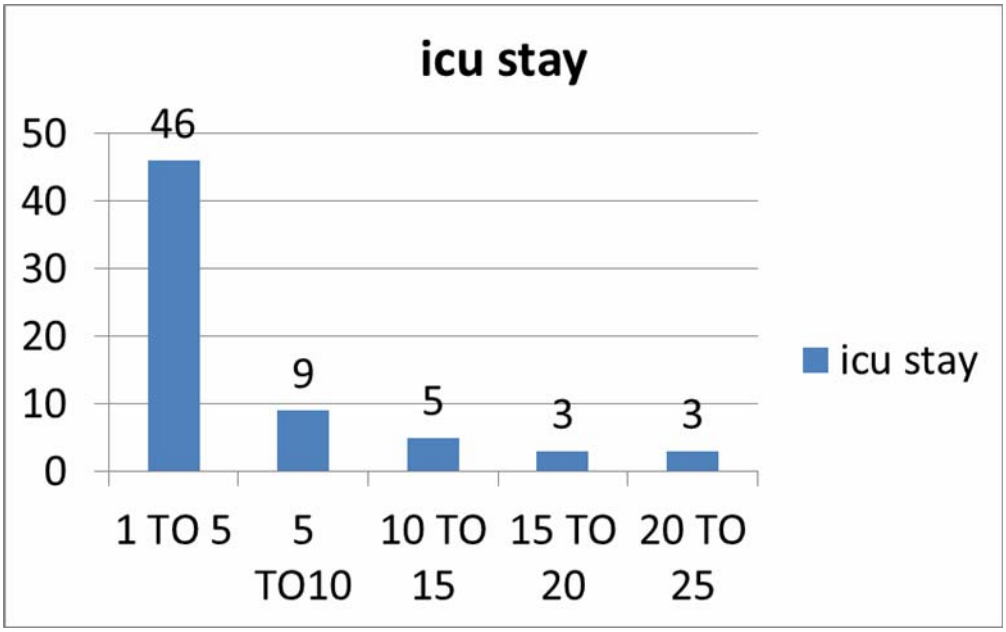
50-60 days - 1(1.5%)

Median hospital stay duration was 12 days



The increased hospital stay (more than 20 days) in our study were due to wound complication in 69%, pulmonary complication 15%, renal failure 14% and cardiac complication in 2%.

- Thirty-day and in-hospital mortality was two (3%).



In study the number of intensive care unit stay of the patient post surgery was

1-5 days -46(69%)

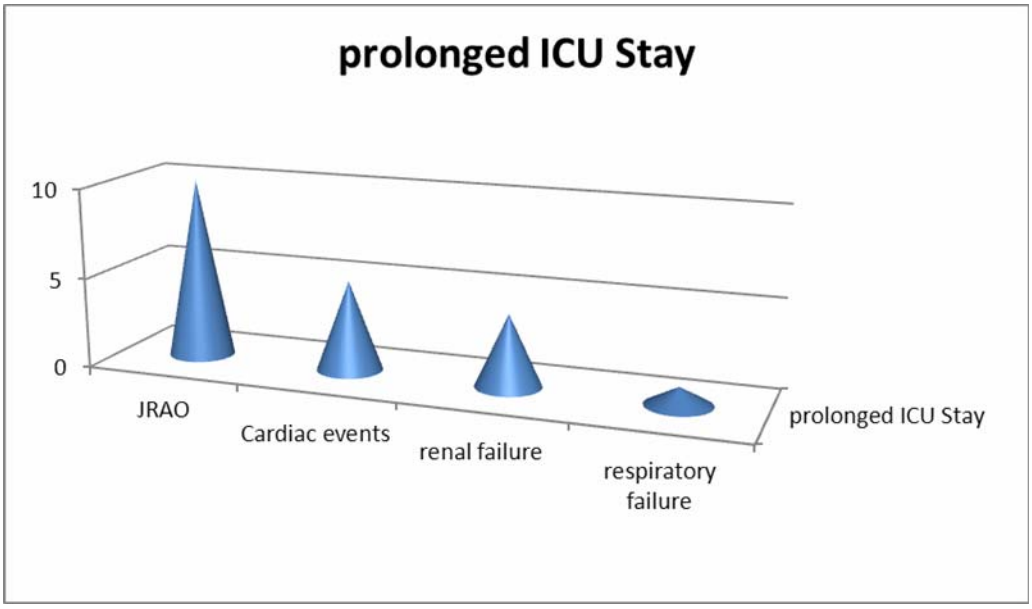
5-10 days- 9(13.6%)

10-15 days - 5(7.4%)

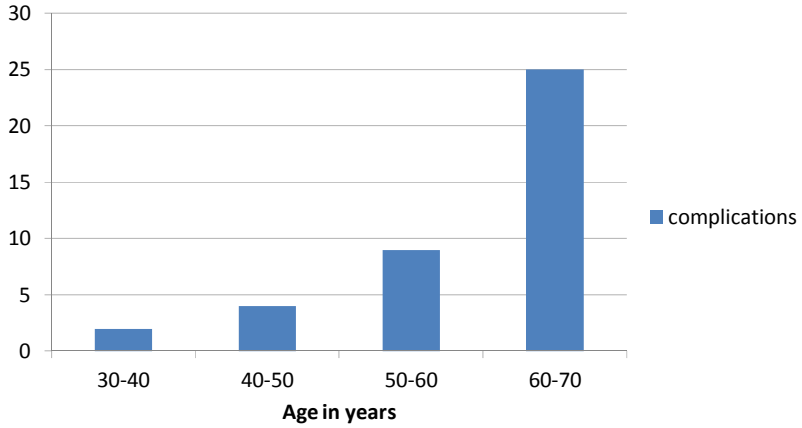
15-20 days - 4(6.5%)

20-25days - 3(4.5%)

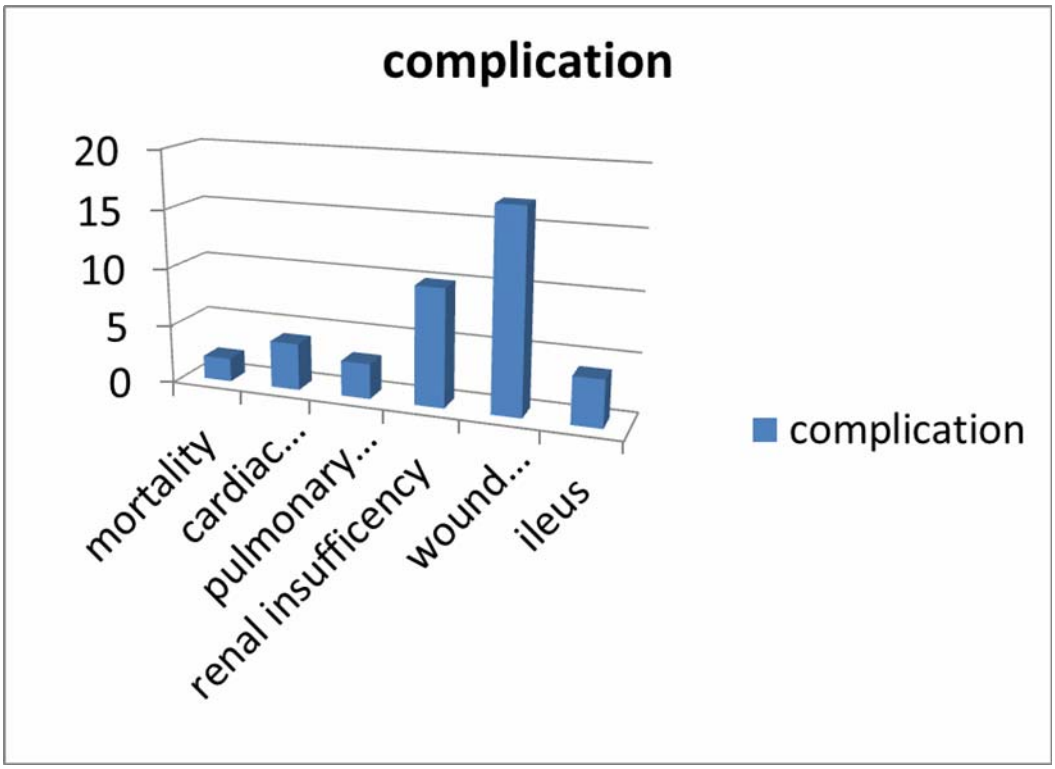
Median ICU stay duration was 4 days



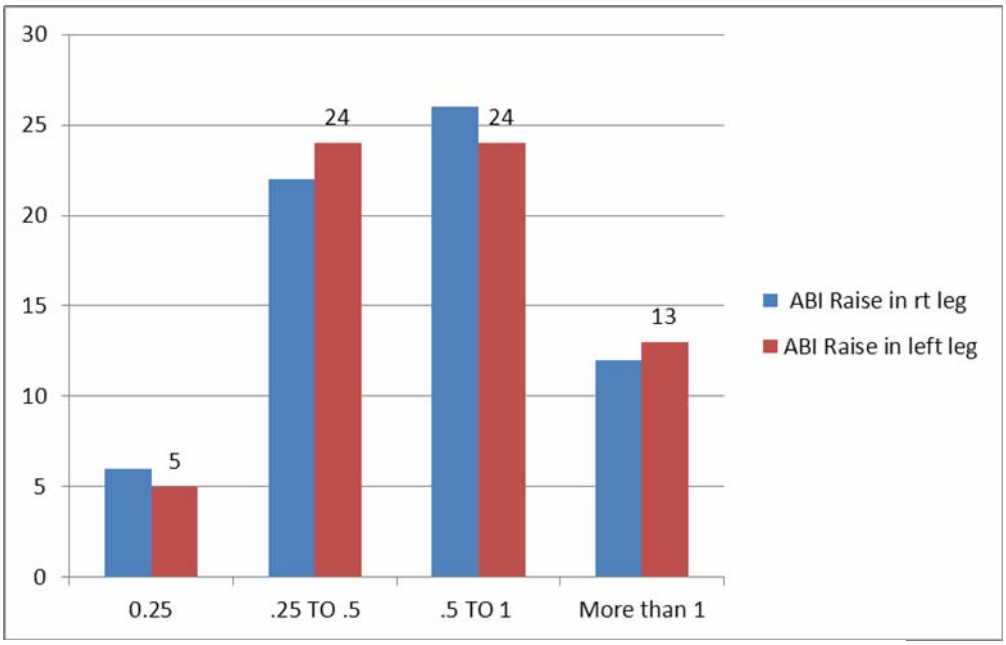
P rolonged ICU STAY IN OUR STUDY was associated with juxta renal aortic occlusion in 10(50%) patients, cardiac events 5(25%) patients ,renal failure in 4(20%) patients &respiratory failure in 1 (5%)patient.



In our study complications occurred in 25(62%) patients in 60-70 age group,9 patients(22%) in 50-60 age group,4 (10%) patients in 40-50 age group and 2(6%) patients in 20-40 age group.

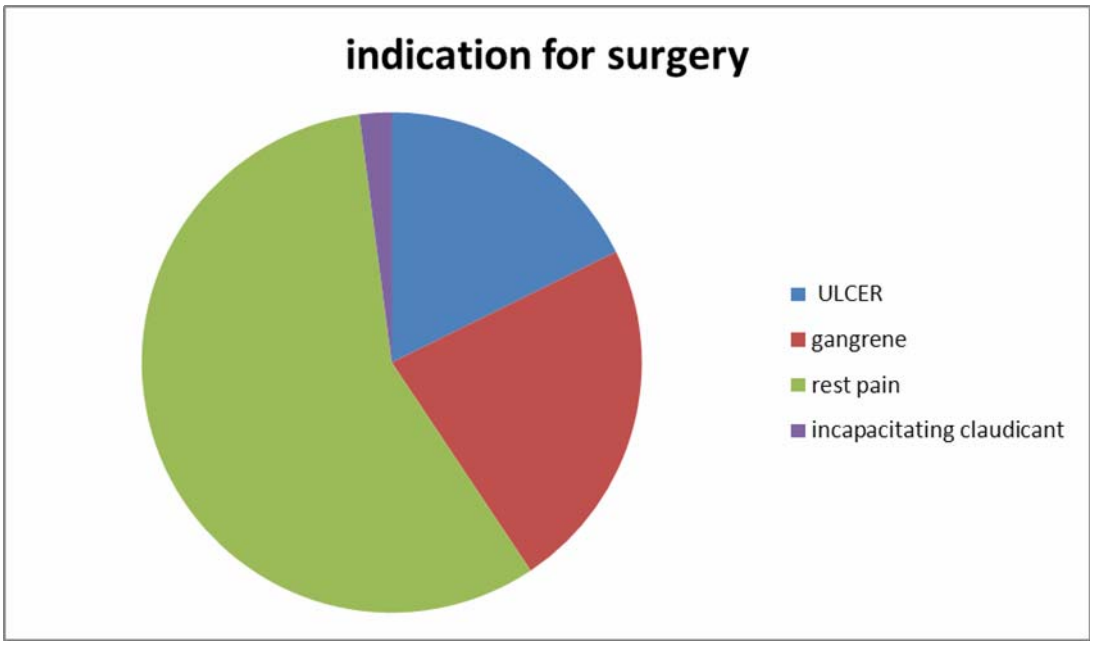


The complication that were encountered in our study was wound complication 42% ,renal complication 25% ,cardiac complication 10% and then respiratory complication 7%

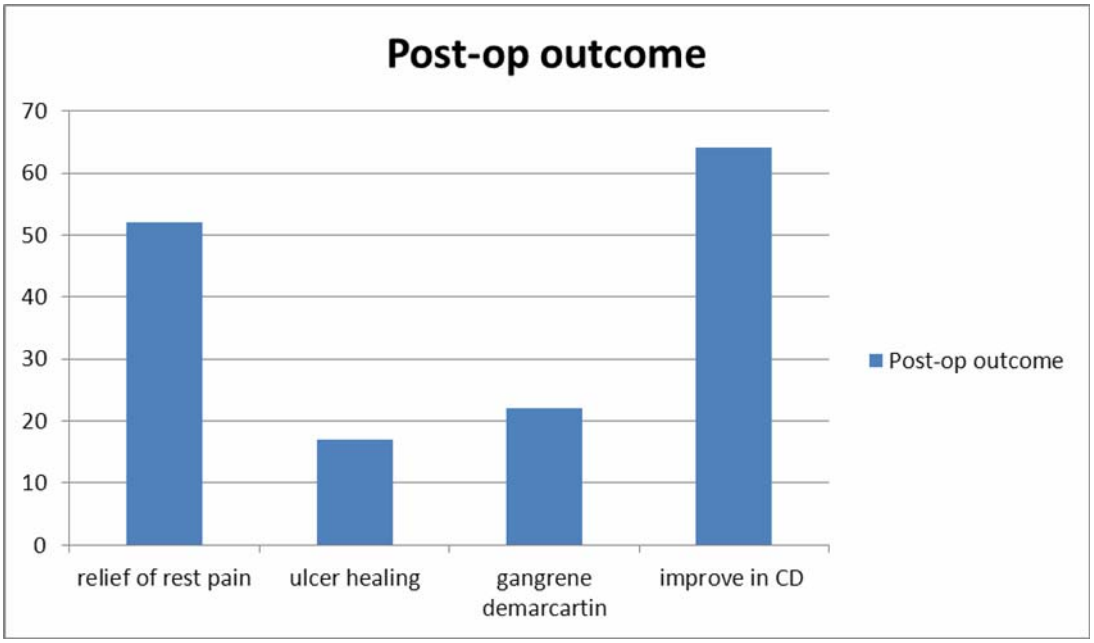


ABI

- Mean increases in right and left ankle-brachial indicess were 0.54±0.25 and 0.59±0.22, respectively.



The indication for surgery in our study was ischemic rest pain in 55(83%) patient, gangrene of lower extremity in 22(33.3%) patients, non healing ulcer in 18 (27.3%)patients and incapacitating claudication in 2(3%) patients.



Post operative outcome in our study was relief of rest pain in 52 patients(96%),ulcer healing in 16 patients(95%), demarcation of gangrene in 21(95%) patients and improvement in claudication distance in 64%(96%).

GRAFT THROMBOSIS:

Early:

3 patient had early graft thrombosis of one limb post anastomosis for which on table thrombectomy was done in 2 patient and one patient had an extension bypass from the femoral anastomosis hood into proximal Popliteal artery with a PTFE graft.

Late graft thrombosis: 3 patients had late graft thrombosis, one patient was treated conservatively and 2 patient had surgery. One had graft thrombectomy alone, one had a distal extension bypass with PTFE graft to proximal Popliteal artery.

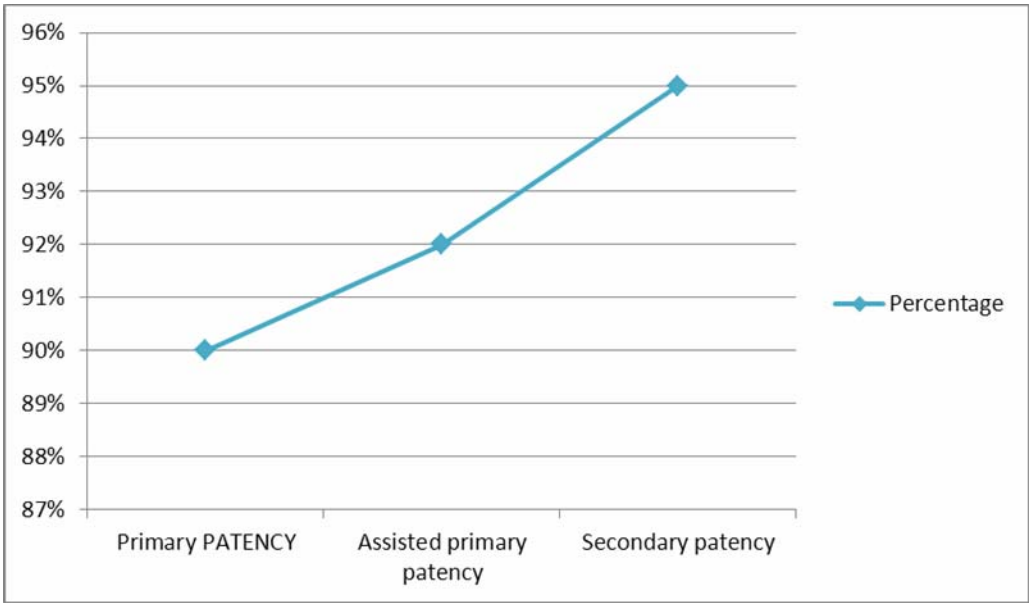
Graft infection: in our series we did not have any graft infection during the study period.

Haemorrhage: one patient had reactionary haemorrhage on the second post operative day, he was taken up for surgery, intra-operatively she developed Disseminated intra vascular coagulation and expired.

Graft patency:

Primary patency: 60 patients had a patent graft at the end of study period. The primary patency of 90%. One patient had a thrombectomy for failing graft and the assisted primary patency is 92%.

Secondary patency : one patient had graft thrombectomy,one patient had graft thrombectomy with extension bypass, hence the secondary patency was 95%



DISCUSSION

In this era with advancement of endo- vascular technology and gadgets available for treatment of aorto-iliac occlusion, surgery still has vital role in treating Aorto- iliac lesions with good results, with acceptable mortality and morbidity.

Our centre being a tertiary referral centre with high volume of cases, we liked to study the outcome of patients undergoing the surgery in form improvement in claudication distance, improvement in ABI, Ulcer healing ,relief of rest pain, graft patency ,post-op complication, number of hospital stay, number of ICU stay and mortality.

In our study group Aorto bi femoral bypass(59%) is largest in size, since most of our cases come with ulcer /gangrene at late stages, moreover as previous studies noted that femoral anastomosis had better patency and is technically less challenging.

The next largest surgical group is aorto bi iliac bypass (37.8%), this surgical method has advantage of avoiding the groin anastomosis, easy tunnelling of the graft and reduction in the length of the graft limb, one dis advantage in this method is decreased patency with iliac anastomosis as reported by De varie et al., since

iliac vessel are involved more than femoral vessel during disease progression. But in our study there was no change in graft patency in both the groups.

In our study most patients were male (93%), this is well in accordance to meta-analysis of Johnson et al where they had a 91% male patient in their study group.

The percentage of females in our study group was 7%., the percentage of female patient in other studies varied from 6% Nevelsteen et al and Pitrowski et al to 68% of the operated patient in jensen et al.

In our study most patient(45%) belonged to the age group of 50 to 60 years, median age 51.9 years, this is well in accordance to meta-analysis of DE vries et al where the mean age in their study was 53 years.

In our study while assessing the risk factors smoking (93.3%) was the highest risk factor followed by hypertension (70%), diabetes (40%) and Chronic kidney disease.

In the study population 28% had coronary artery disease, 21% had chronic obstructive pulmonary disease, and 3% had chronic kidney disease. In a study by Mark pass mann et al he

found 82% were smokers, 38% had coronary artery disease and 20% were diabetic .

In study by Ballard et al he found 50% were smokers, 54%had coronary artery disease, 65% were hypertensive,22% were diabetics and 41% had hyperlipidemia.

In the study 81% had infra renal aortic occlusion & 19 % had juxta renal aortic occlusion.

The commonest indication of surgery was rest pain in 83%, ulcer/ gangrene in 72% and then incapacitating claudication in 3%.

In the study group the highest number of ICU stay was in the group of 0-5 days, the median ICU stay length was 5 days. Juxta renal aortic occlusion(50%), cardiac events(25%), renal failure(20%) was the cause for increased ICU stay.

In the study the highest number of in hospital stay was 1 to 10 day group, the commonest reason for prolonged hospital stay was wound complication in 69%, pulmonary complication 15%, renal failure 14% and cardiac complication in 2%.

There were 2 (3%) mortality in our group, one female& one male, there by indicating no sex predilection predicting mortality.

In our study both the patient belonged to 60-70 age group, there by indicating that increasing age is a significant risk factor in predicting the outcome of the patient. Both the patient had co-morbidity like Diabetes, hypertension and coronary artery disease. Mortality rates varies from 0.0%, Friedman et al to 8.8% Mulcare et al. Hence our series mortality rates are well within literature studies.

Females had higher mortality(25%) and morbidity when compared to males, but the number of female patient in the study are very less to show any significance.

The complication that were encountered in our study was wound complication 42%, renal complication 25%, cardiac complication 10% and then respiratory complication 7%. We believe that pre operative optimising the respiratory status by physiotheraphy, smoking cessation and broncho- dilators along with aggressive post –op physiotheraphy have reduced our respiratory complications.

In our study patients postoperatively 99% had relief of rest pain, 98.5% had ulcer healing and nearly all patients had increase in claudication distance.

In our study complications occurred in 25(62%) patients in 60-70 age group,9 patients(22%) in 50-60 age group, 4 (10%) patients in 40-50 age group and 2(6%) patients in 20-40 age group. The reason for which complication occurred more in the 60 to 70 age group may be because of multiple co-morbid in these age group.

In our study the Primary patency is 90% and the assisted primary patency is 92%, the secondary patency was 95%.

In a study by Amy reed et al primary patency was 87% .the primary patency in the current studies is varying from 82 to 85%.Hence our patency rates are well in accordance with other studies.

CONCLUSION

1. In our study most of the patient were males 93%
2. Average age group who undergone surgery was 51.9 years.
3. Commonest age group was 50-60 years
4. Most of them were smokers (94%)
5. Commonest risk factors was hypertension(72%), Diabetes(40%) and hyper lipidemia.50%
6. In the study population 28% had coronary artery disease, 21% had chronic obstructive pulmonary disease, and 3% had chronic kidney disease as co –morbidity.
7. Most common indication for surgery was critical limb ischemia (97%)
8. Aorto bi femoral bypass was the commonest surgery done in our study (60%)
9. Mean period of Intensive care unit stay post surgery was 5 days.
10. Prolonged period of Intensive care unit stay post surgery was due to Juxta renal occlusion (50%)cases,cardiac complication(20%) and renal failure(25%).
11. Mean period of hospital stay post surgery was 12 days.
12. Commonest group of hospital stay was 1- 10 days (44%)

13. Prolonged hospital stay was due to wound complication (65%).
14. Mortality in our study was 3%.
15. The cause of mortality in one case was cardiac event and other was disseminated intra vascular coagulation.
16. Improvement in right and left ankle-brachial indices were 0.54±0.25
17. In our study 99% had relief of rest pain, 98.5% had ulcer healing and nearly all patient had increase in claudication distance
18. Over all primary patency was 90% in our study.

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INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI-3

EC Reg No.ECR/270/Inst./TN/2013
Telephone No : 044 25305301
Fax: 044 25363970

CERTIFICATE OF APPROVAL

To

Dr.M.Balaji,
Postgraduate in M.Ch., Vascular Surgery,
Department of Vascular Surgery,
Madras Medical College, Chennai-3.

Dear **Dr.M.Balaji,**

The Institutional Ethics Committee of Madras Medical College, reviewed and discussed your application for approval of the proposal entitled "**Outcome Analysis of Open Aortic Surgery for Chronic Aortoiliac Occlusion**" No.02122013.

The following members of Ethics Committee were present in the meeting held on 04.02.2014 conducted at Madras Medical College, Chennai-3.

1.	Dr. G. Sivakumar, MS FICS FAIS	-- Chairperson
2.	Prof. B.Kalaiselvi, MD Vice Principal, MMC, Ch-3	-- Member Secretary
3.	Prof. Ramadevi, Director i/c, Instt. of Biochemistry, Chennai.	-- Member
4.	Prof.Geetha Devadas Professor of Pathology, MMC, Ch-3	-- Member
5.	Prof.K.Sivasubramanian, I/c. Director, Institute of Internal Medicine, MMC, Ch-3	-- Member
6.	Thiru. S. Govindasamy, BA., BL	-- Lawyer
7.	Tmt.Arnold Saulina, MA MSW	-- Social Scientist

We approve the proposal to be conducted in its presented form.

Sd/Chairman & Other Members

The Institutional Ethics Committee expects to be informed about the progress of the study, and SAE occurring in the course of the study, any changes in the protocol and patients information / informed consent and asks to be provided a copy of the final report.

20/2/14

Member Secretary, Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE
CHENNAI-600 003

ஆராய்ச்சி ஒப்புதல் படிவம்

ஆராய்ச்சி தலைப்பு

வயிற்றுப் பெருந்தமணி அடைப்பு நோய்க்கு பெருந்தமணி அறுவை சிகிச்சையின் விளைவுகள் மற்றும் பலன்கள்- ஓர் ஆய்வு

ஆராய்ச்சி நிலையம் : **இராஜீவ் காந்தி அரசு பொது மருத்துவமனை,** சென்னை-3.

பெயர் : வயது :

ஆராய்ச்சி சேர்க்கை எண் : தேதி:

பங்கு பெறுபவர் இதனை (✓) குறிக்கவும்

மேலே குறிப்பிட்டுள்ள மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது. என்னுடைய சந்தேகங்களை கேட்கவும், அதற்கான தகுந்த விளக்கங்களை பெறவும் வாய்ப்பளிக்கப்பட்டது. ☐

நான் இவ்வாய்வில் தன்னிச்சையாகதான் பங்கேற்கிறேன். எந்த காரணத்தினாலோ எந்த கட்டத்திலும் எந்த சட்ட சிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்வில் இருந்து விலகி கொள்ளலாம் என்றும் அறிந்து கொண்டேன். ☐

இந்த ஆய்வு சம்பந்தமாகவோ, இதை சார்ந்த மேலும் ஆய்வு மேற்கொள்ளும் போதும் இந்த ஆய்வில் பங்குபெறும் மருத்துவர் என்னுடைய மருத்துவ அறிக்கைகளை பார்ப்பதற்கு என் அனுமதி தேவையில்லை என அறிந்து கொள்கிறேன். நான் ஆய்வில் இருந்து விலகிக் கொண்டாலும் இது பொருந்தும் என அறிகிறேன். ☐

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களையும், பரிசோதனை முடிவுகளையும் மற்றும் சிகிச்சை தொடர்பான தகவல்களையும் மருத்துவர் மேற்கொள்ளும் ஆய்வில் பயன்படுத்திக்கொள்ளவும் அதை பிரசுரிக்கவும் என் முழு மனதுடன் சம்மதிக்கின்றேன். ☐

இந்த ஆய்வில் பங்கு கொள்ள ஒப்புக்கொள்கிறேன். எனக்கு கொடுக்கப்பட்ட அறிவுரைகளின்படி நடந்து கொள்வதுடன் 'இந்த ஆய்வை மேற்கொள்ளும் மருத்துவ அணிக்கு உண்மையுடன் இருப்பேன் என்று உறுதியளிகிறேன். எனது உடல்நலம் பாதிக்கப்பட்டாலோ அல்லது வழக்கத்திற்கு மாறான நோய்க்குறி தென்பட்டாலோ உடனை அதை மருத்துவ அணியிடம் தெரிவிப்பேன் என்று உறுதி அளிக்கிறேன். ☐

.....	.....	.....
பங்கேற்பாளர் பெயர்	கையொப்பம்/ கைரேகை	தேதி

.....	.....	.....
ஆராய்ச்சியாளரின் பெயர்	கையொப்பம்	தேதி

<u>ஆராய்ச்சி தகவல் தாள்</u>

தலைப்பு

வயிற்றுப் பெருந்தமணி அடைப்பு நோய்க்கு பெருந்தமணி அறுவை சிகிச்சையின் விளைவுகள் மற்றும் பலன்கள்– ஓர் ஆய்வு

சென்னை இராஜீவ்காந்தி அரசு பொது மருத்துவனையில் வயிற்றுப் பெருந்தமணி அடைப்பு நோய்க்கு பெருந்தமணி அறுவை சிகிச்சையின் விளைவுகள் மற்றும் பலன்கள் பற்றிய ஓர் ஆய்வு இங்கு நடைபெறுகிறது.

முடிவுகளை அல்லது கருத்துகளை வெளியிடும்போதோ அல்லது ஆராய்ச்சியின் போதோ தங்களது பெயரையோ அல்லது அடையாளங்களையோ வெளியிடமாட்டோம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த சிறப்பு சிகிச்சையின் முடிவுகளை ஆராய்ச்சியின்போது அல்லது ஆராய்ச்சியின் முடிவின் போது தங்களுக்கு அறிவிக்கப்படும் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியில் பங்கேற்பது தங்களுடைய விருப்பத்தின் பேரில் தான் இருக்கிறது. மேலும் நீங்கள் எந்நேரமும் இந்த ஆராய்ச்சியிலிருந்து பின்வாங்கலாம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

.....	.....	.....
பங்கேற்பாளர் பெயர்	கையொப்பம்/ கைரேகை	தேதி

.....	.....	.....
ஆராய்ச்சியாளரின் பெயர்	கையொப்பம்	தேதி

INFORMED CONSENT FORM

TITLE OF THE STUDY -

"Outcomes of Open Aortic surgery in patients with chronic Aorto iliac occlusion – A Clinical Study"

Name and Age of the participant:

Exercising my free power of choice, hereby give my consent to be included as a participant in ___ _____

Name of the Principal/Co-Investigator: _____

Name of the Institution: Department of Vascular Surgery, Madras Medical College and Rajiv Gandhi government general hospital, Chennai

I,_____(name of participant), have read the information in this form (or it has been read to me). I was free to ask any questions and they have been answered. I am over 18 years" (title of the study)

1) I have read and understood this consent form and the information provided to me.

2) I have had the consent document explained to me.

3) I have been explained about the nature of the study.

4) I have been explained about my rights and responsibilities by the investigator.

5) I have informed the investigator of all the treatments I am taking or have taken in the past _____ months including any native (alternative) treatments.

6) I have been advised about the risks associated with my participation in the study.

7) I agree to cooperate with the investigator and I will inform him/her immediately if I suffer unusual symptoms.

8) I have not participated in any research study within the past _____ month(s).

9) [I have not donated blood within the past _____months

10) I am aware of the fact that I can opt out of the study at any time without having to give any reason and this will not affect my future treatment in the hospital

11) I am also aware that the investigators may terminate my participation in the study at any time, for any reason, without my consent.

12) I hereby give permission to the investigators to release the information obtained from me as result of participation in this study to the sponsors, regulatory authorities, Government agencies, and ethics committee. I understand that they may inspect my original records.

13) I understand that my identity will be kept confidential if my data are publicly presented.

14) I have had my questions answered to my satisfaction.

15) I consent voluntarily to participate as a participant in the research study.

I am aware, that if I have any questions during this study, I should contact the investigators. By signing this consent from, I attest that the information given in this document has been clearly explained to me and understood by me. I will be given a copy of this consent document.

For adult participants

Name and signature / thumb impression of the participant (or legal representative if participant incompetent):

(Name) _____(Signature)_____ Date: _____

Name and signature of impartial witness (required for illiterate patients):

(Name) _____(Signature)_____ Date: _____

Address and contact number of the impartial witness: _____

Name and signature of the Investigator or his representative obtaining consent:

(Name) _____(Signature)_____ Date: _____

For children being enrolled in research

Whether child's assent was asked: Yes/ No

[If the answer to the above question is Yes, write the following phrase:

You agree with the manner in which assent was asked for from your child and given by your child.

You agree to have your child take part in this study.]

[If answer to the above question is No, give reason(s):_____

Although your child did not or could not give his or her assent, you agree to your child's participation in this study.]

Name and signature / thumb impression of the participant's parent(s) (or legal representative):

(Name) _____(Signature)_____ Date: _____

(Name) _____(Signature)_____ Date: _____

Name and signature of impartial witness (required if parents of participant child illiterate):

(Name) _____(Signature)_____ Date: _____

Address and contact number of the impartial witness: _____

_____

Name and signature of the Investigator or his representative obtaining consent:

(Name) _____(Signature)_____ Date: _____

PROFORMA

Name of the patient:

Age of the patient:

Sex of the patient:

Level of lesion: Infra renal occlusion/Juxta-renal occlusion

Indication for surgery:

Gangrene/ulcer

Rest pain

Incapcitating Claudicant

Pre operative work up :

CT Angiogram- Site of occlusion

Distal reformation

Angiographic runoff score

Pre operative ABI.

Chest x-ray

Pulmonary function Test

Echo Cardiography

Cardiologist opinion

Renal function test

Previous cerebral infarction –Carotid duplex

History of tobacco abuse

Open aortic - Surgeries performed :

Aortic endartrectomy,

Aorto-bi Iliac bypass,

Aorto-bi femoral bypass

Graft used :PTFE,Dacron

Patients screened postoperatively for graft patency

Pulse status

ABI determination

$TcPO^2$

Duplex scan

Arteriography

- Operative details

Surgical procedure performed

Inflow vessel site

Inflow vessel wall / disease

Outflow vessel site

Outflow vessel wall / disease

Runoff

Sequential bypass if any

- Post operative details

Category improvement

Rest pain relief

Ulcer healing

Improvement Ankle brachial index

Wound complication

Further interventions, if any

OUTCOME

30 day mortality

morbidity(in form of hospital stay,ICU stay),

complications,

graft patency ,

improvement in ABI

limb salvage – ulcer healing &Demarcation of Gangerene

DISCHARGE STATUS:

Ulcer healing

Relief of Rest Pain

Improvement in claudication disease

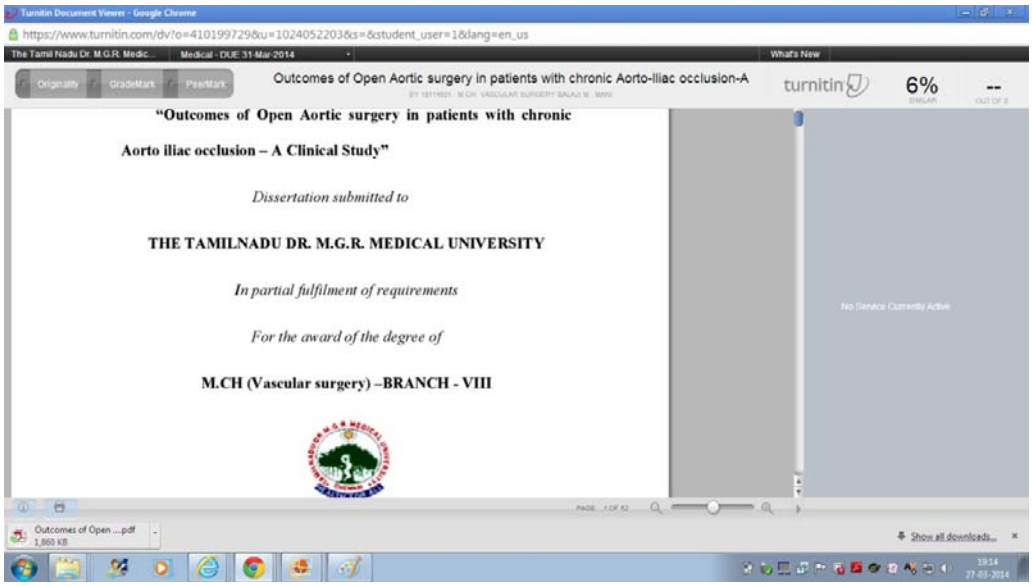
FOLLOW UP: After 1, 3, 6 & 12 months

Name	SEX	AGE	HT	DM	Smoking	hyper lipidemia	COPD	CAD	CKD	OCCLUSON	Surgery Performed	No of ICU stay	No.of Hospital stay	Cardiac complicaton	Mortality	RS complication	Renal complication	Wound complication	Increase in ABI
Narayanan	m	55	Y	Y	Y		Y			IRAO	ABF	4	9						1.2
Krishnan	m	44	Y		Y	Y		Y		IRAO	ABI	6	14	y				y	0.7
shanmugam	m	54	Y	Y	Y					IRAO	ABF	4	8						0.5
Kyuli	F	47	Y		N	Y				IRAO	AE	5	12					y	1.2
Andavan	m	56	Y	Y	Y			Y		IRAO	ABF	3	8	y					..6
Moses	m	48	Y		Y	Y				IRAO	ABI	5	12				y		1.3
Kathiravan	m	57	Y		Y		Y	Y		IRAO	ABI	6	8	y					0.8
Laxmi	F	52	Y		N	Y	Y			IRAO	ABF	3	7		y				0.7
Kamban	m	49	Y		Y	Y				IRAO	ABI	5	43					y	0.7
Muniyan	m	57	Y	Y	Y	Y	Y			JRAO	ABI	8	43					y	0.6
Munusamy	m	58	Y		Y		Y			IRAO	ABF	4	12						0.4
joseph	m	32			Y	Y		Y		IRAO	ABI	4	8						1.2
iliyas	m	45			Y					JRAO	ABF	6	16	y		y	y	y	0.5
kabish	m	56	Y	Y	Y	Y		Y		IRAO	ABI	3	9						1.2
punniya kotti	m	59	Y		Y		Y			IRAO	ABI	4	9						0.8
ponnusamy	m	46			Y	Y				IRAO	ABF	4	9						0.4
ponnian	m	56	Y	Y	Y			Y		IRAO	ABI	2	9						1.1
puli samy	m	47			Y					JRAO	ABF	7	16			y		y	0.9
saravanan	m	56	Y		Y	Y		Y		IRAO	ABF	2	9						0.3
muniyamal	m	54	Y	Y	Y		Y	Y		IRAO	ABF	3	9						0.4
katahvarayar	m	49	Y		Y	Y				IRAO	ABI	8	15			y		y	1.1
myilsakmy	m	58	Y		Y			Y		JRAO	ABF	8	42	y		y		y	0.8
ashikan	m	34		Y	Y	Y				IRAO	ABI	2	9						1.2
raman	m	35			Y					IRAO	ABF	2	9						0.7
sita	f	56	Y		N	Y		Y		IRAO	ABF	2	9						1.2
silamban	m	68	Y	Y	Y	Y	Y	Y	Y	JRAO	ABF	7	9				y		0.6
jack disoso	m	47	Y		Y	Y				IRAO	ABF	2	9						1.2
ezhili	F	52	Y		N	Y		Y		IRAO	ABF	3	7						0.4

bala	m	67	Y	Y	Y			Y		IRAO	ABF	3	8						0.4
srirangan	m	46	Y		Y		Y			JRAO	ABF	8	17				y	y	1.1
chinnakANNU	m	64	Y		Y	Y		Y		IRAO	ABF	3	9						0.4
singaram	m	57	Y	Y	Y	Y				IRAO	ABF	3	9						1.1
tirupathi	m	53			Y	Y	Y			JRAO	ABF	21	42	y		y	y	y	0.8
ramesh	m	64	Y		Y	Y		Y		IRAO	AE	3	9						0.2
madrai	m	43		Y	Y					IRAO	ABF	3	9						0.7
myil samy	m	62	Y		Y	Y		Y		JRAO	ABF	23	39				y	y	0.6
myilavan	m	56	Y		Y					IRAO	ABF	3	9						0.7
punniya selvan	m	45		Y	Y					IRAO	ABI	2	9						0.8
akbar basha	m	69	Y		Y	Y	Y	Y	Y	JRAO	ABF	16	37	y			y	y	0.2
anthony	m	58	Y	Y	Y	Y		Y		IRAO	ABI	4	9						0.7
ammavasai	m	64	Y		Y	Y		Y		IRAO	ABF	3	9						0.4
guna	m	45	Y	Y	Y		Y			IRAO	ABI	3	9						0.6
arumugam	m	54	Y		Y	Y				IRAO	ABF	3	9						0.4
kishnan	m	63	Y		Y	Y	Y			IRAO	ABI	3	8						0.55
kumaran	m	44		Y	Y					IRAO	ABF	3	13				y		0.6
nagarajan	m	37			Y					IRAO	ABF	3	8						0.4
daniel	m	63	Y	Y	Y	Y		Y		JRAO	ABF	3	8						0.5
lingan	m	54		Y	Y					JRAO	ABF	16	45				y	y	0.8
subramani	m	35		Y	Y					IRAO	ABF	4	14						0.4
elumalai	m	61	Y		Y	Y	Y	Y		IRAO	ABF	4	15					y	0.9
vasudevan	m	57	Y		Y	Y				IRAO	ABF	4	15					y	0.3
laxmanan	m	36		Y	Y					IRAO	ABI	2	12						0.7
rajesh	m	39			Y					IRAO	ABF	3	13						0.4
umapathy	m	59	Y	Y	Y	Y		Y		IRAO	ABF	3	14					y	0.8
yoga saravanan	m	62	Y		Y			Y		JRAO	ABF	3	13		y				0.7
delhi babu	m	65	Y	Y	Y	Y				IRAO	ABI	2	14				y		0.6
kubendaran	m	36			Y					IRAO	ABF	3	12						0.7
mukanna	m	59		Y	Y	Y		Y		IRAO	ABI	4	12				y		0.2
mugilan	m	68	Y	Y	Y	Y		Y		IRAO	ABF	4	12						0.6
chandran	m	32		Y	Y					IRAO	ABI	2	22					y	0.4
mani	m	57			Y					IRAO	ABF	2	23				y	y	0.2

ponnusamy	m	68	Y	Y	Y			Y		IRAO	ABI	3	22					y	0.6
ponniyan	m	69	Y		Y			Y		IRAO	ABF	3	21					y	0.4
alli muthu	m	47			Y			Y		IRAO	ABI	2	21					y	0.22
mani	m	66	Y		Y					IRAO	ABI	15	62				y	y	0.8
anandan	m	34	Y		Y					IRAO	ABF	3	22					y	0.4

PLAGIARISM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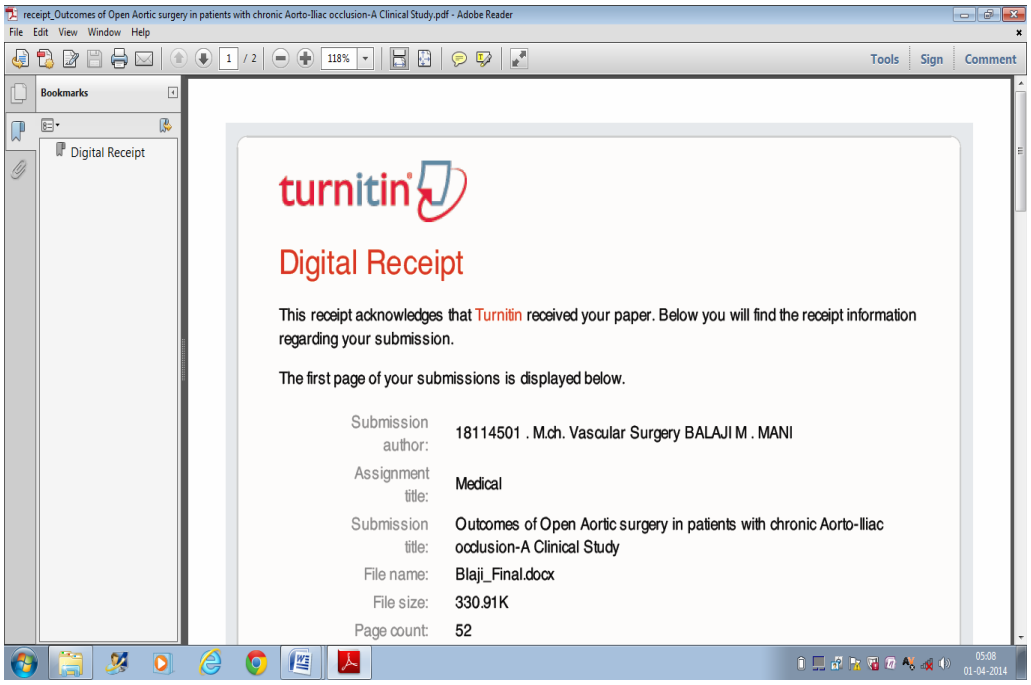
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